OBSERVATIONS OF THE CRAB NEBULA WITH CHANDRA & KECK DURING THE 2011 APRIL γ-RAY FLARE

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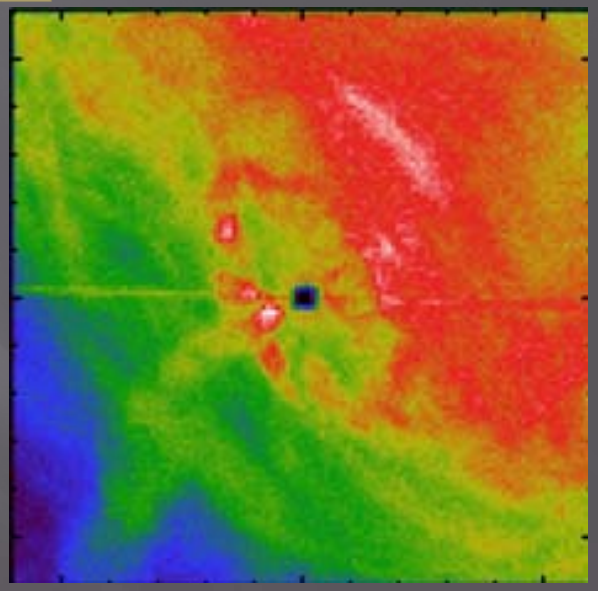

"X-ray Astronomy: towards the next 50 years"
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Performed in collaboration with

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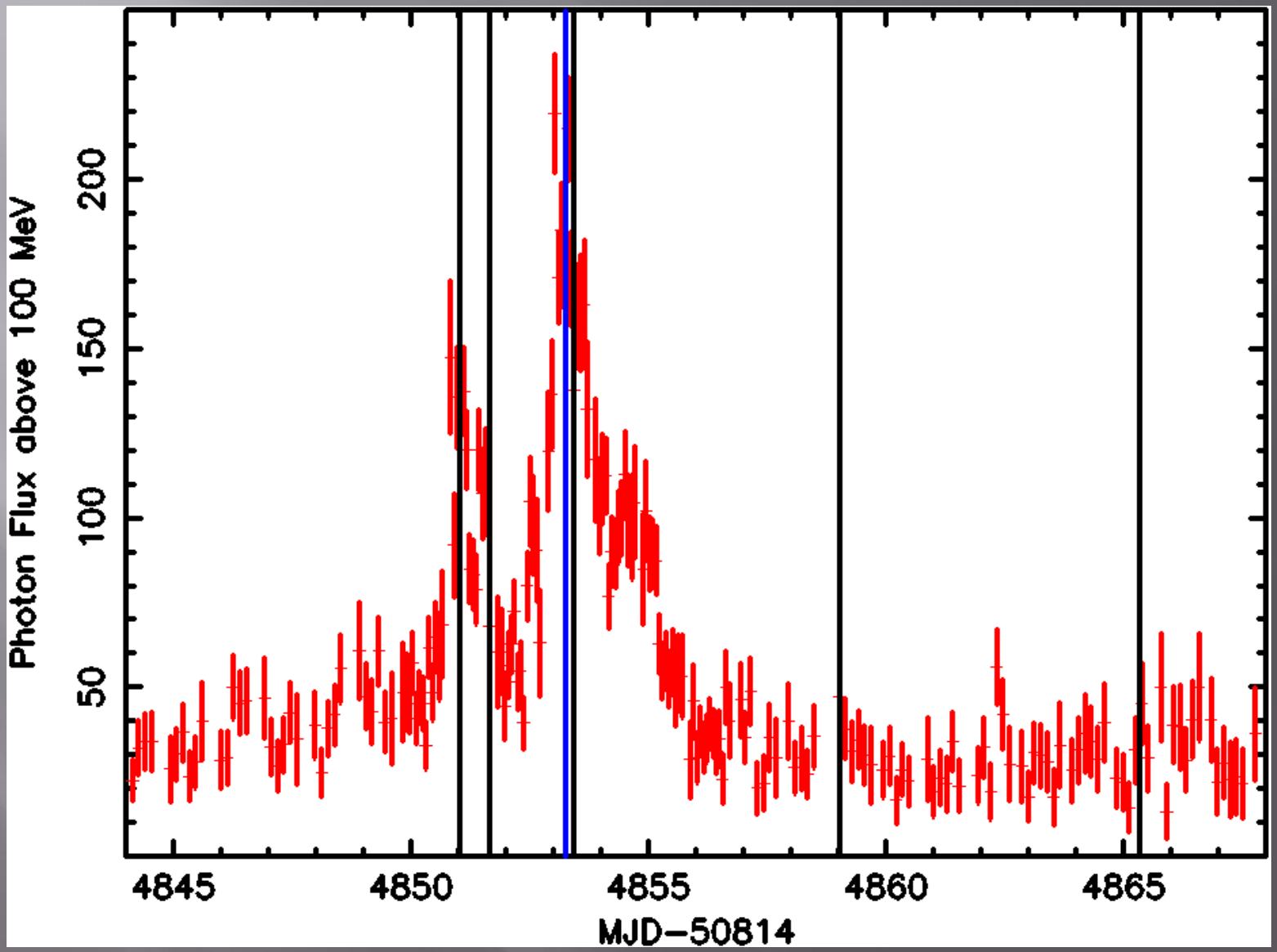
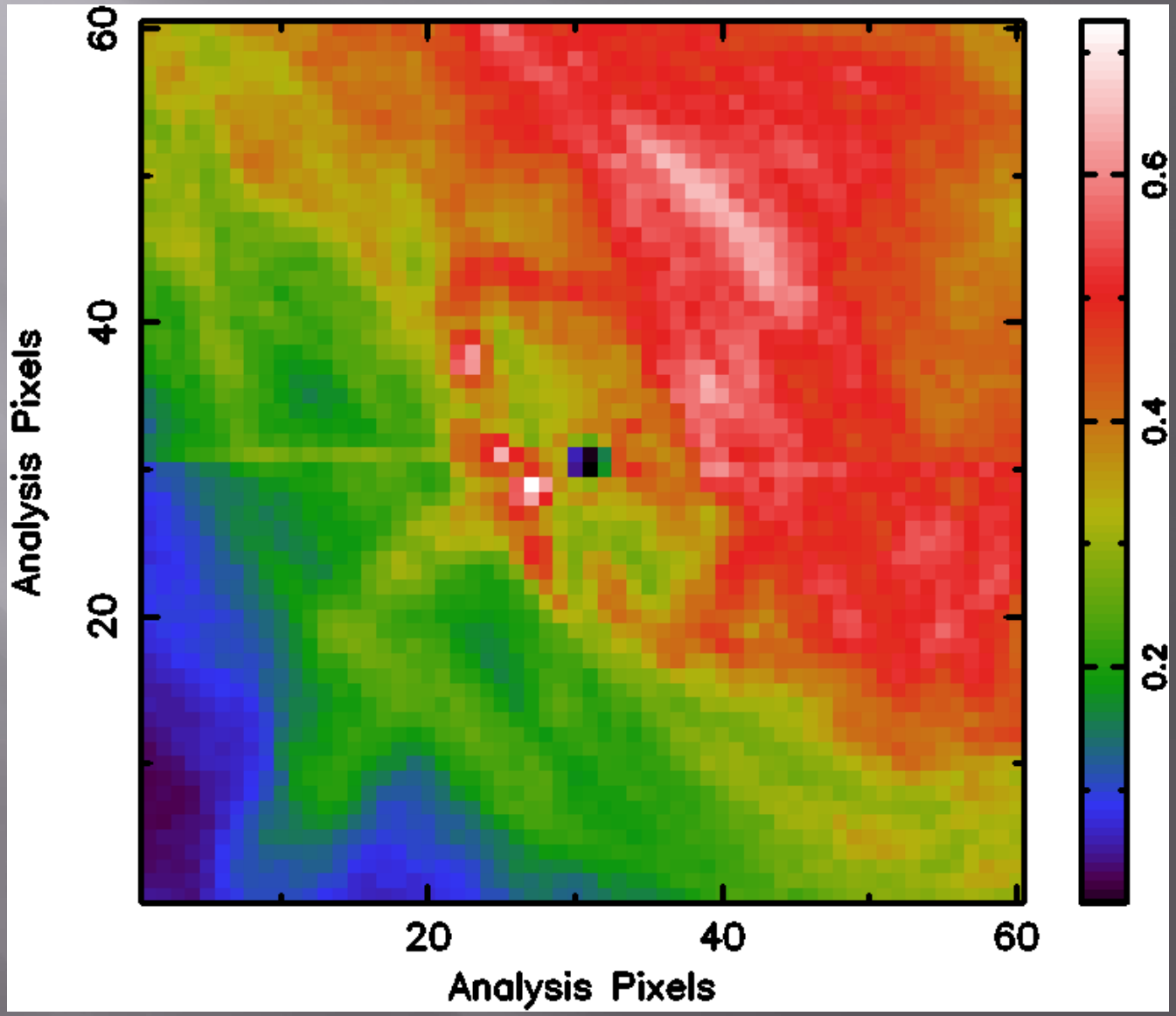
The γ-ray flare of April 2011



Average Chandra image 2011 April



Search for the origin of the γ-ray flares is tricky I

The rise in X-ray flux may slightly lead γ-ray flaring

Acceleration typically reach X-ray energies first

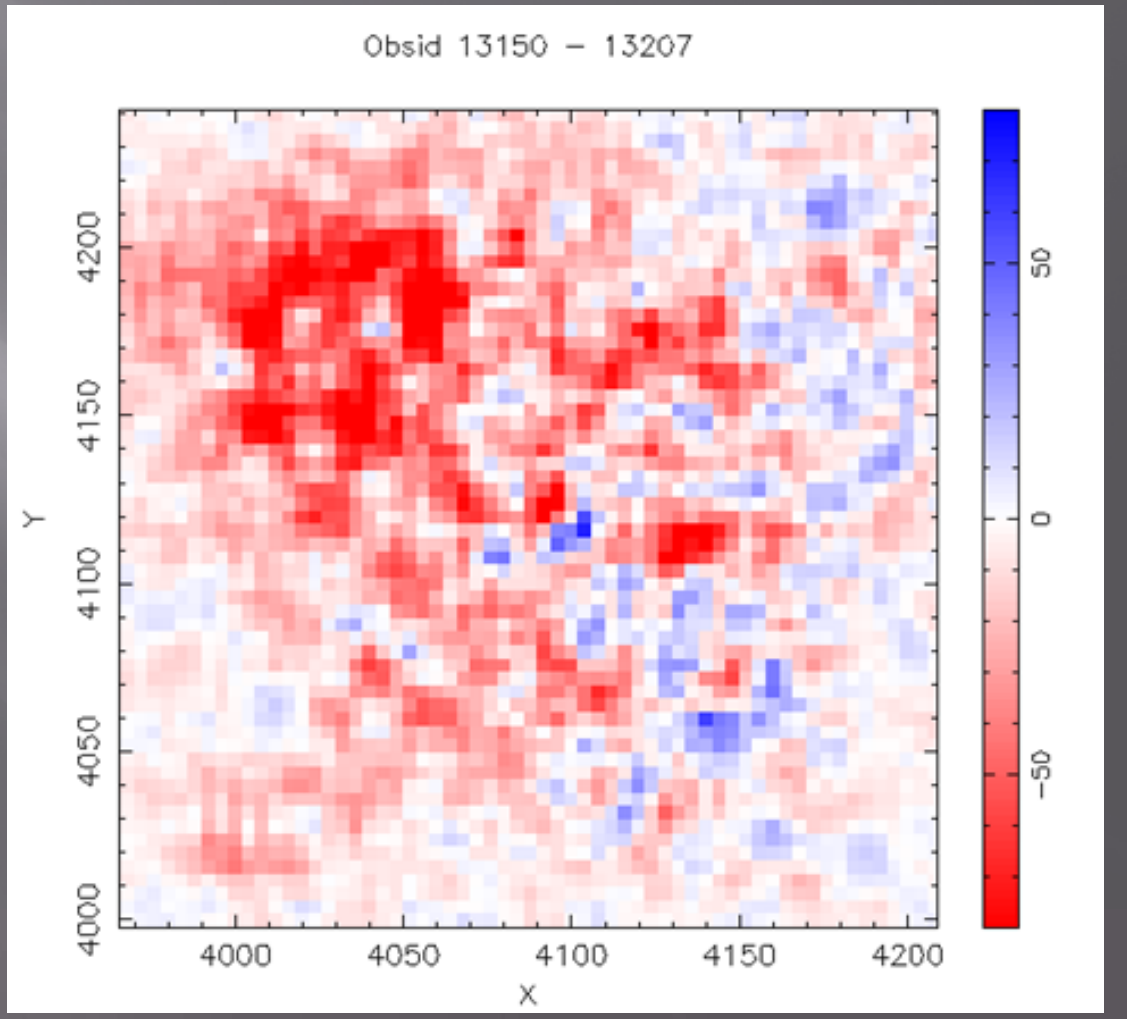
Synchrotron losses will probably cause the γ-ray flux to decline first

The observed count rate is altered due to pileup

Searching for variations is tricky II

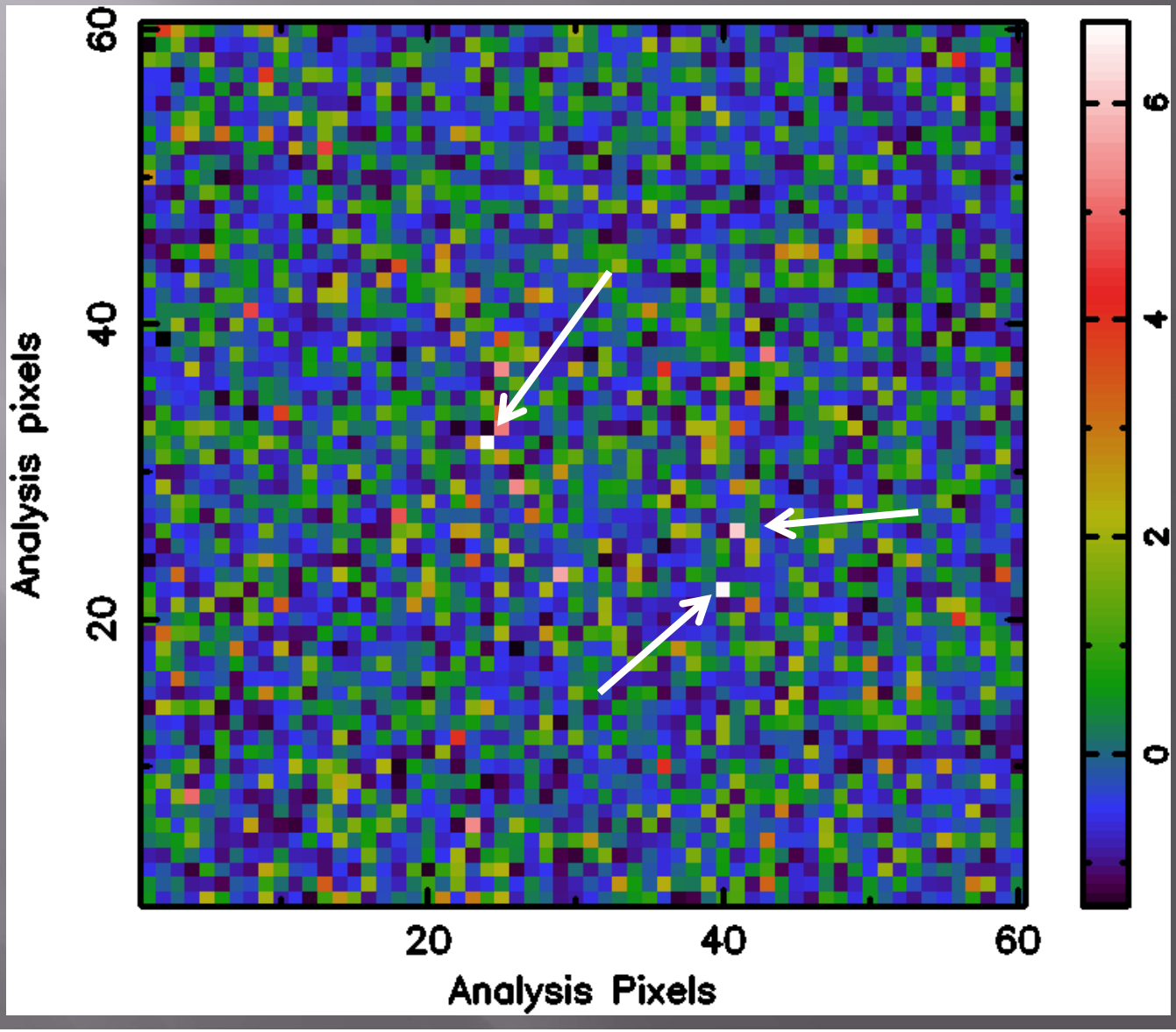
Huge swath of nebular faded in 33 hours?

No!

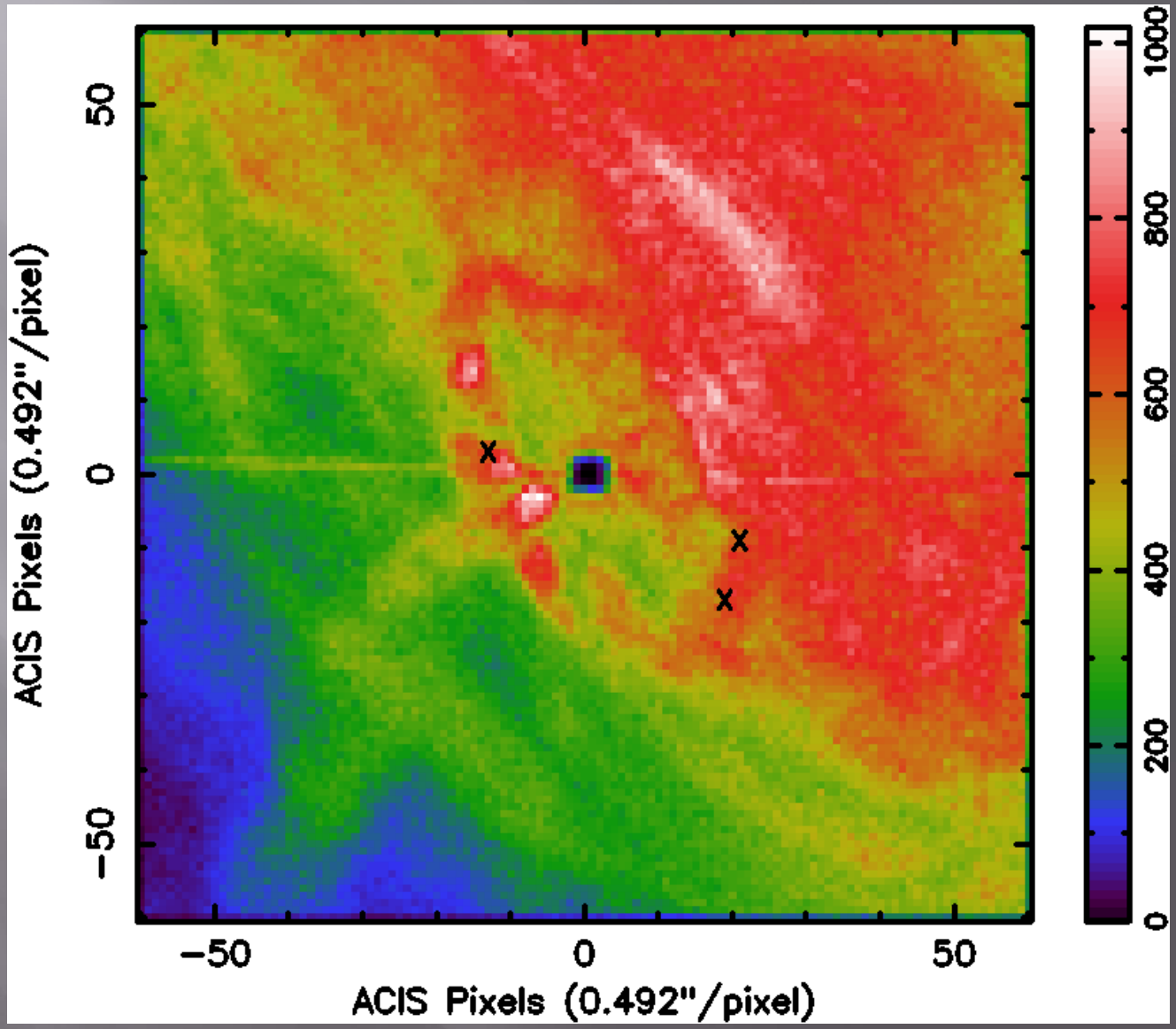


One image is closer to the edge of the detector where the contamination layer is thicker

Is there variability amongst the 5 Chandra images?



The "most significant" variations



The significance image

Are these detections?

We have 3 events with $s \geq 6$

We have 3600 chances to find something

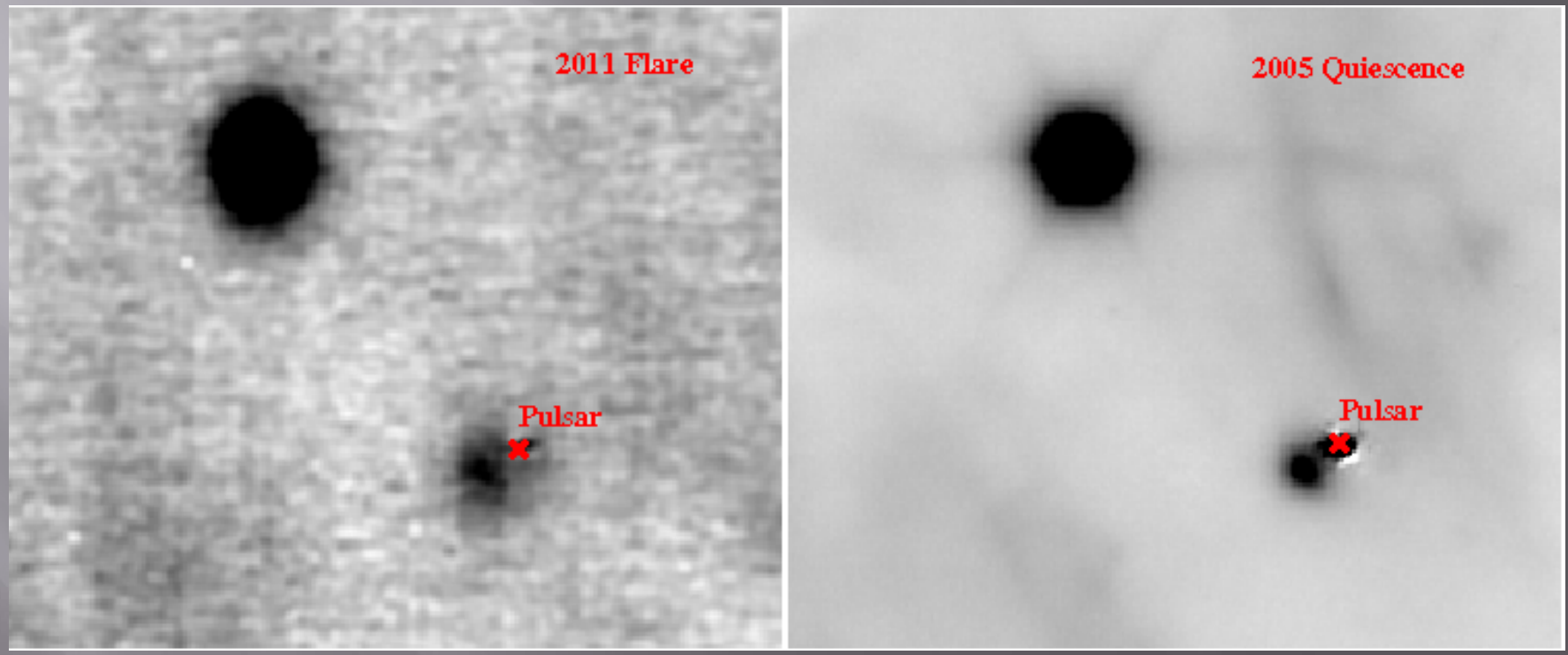
11% probability that there are three or more events with $s > 6$

Short term x-ray variations

We also looked for time variability within each observation, hence time scales < 10,000 seconds

Once again we found no solid evidence for variability

The Keck infrared observation



The spectral energy distribution